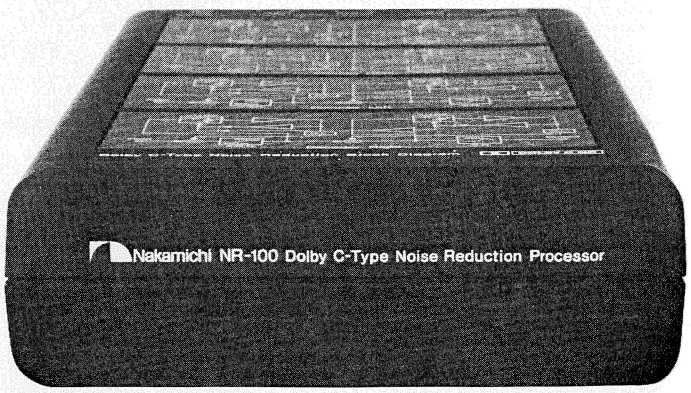
Nakamichi

Service Manual

Nakamichi NR-100

Dolby C-Type Noise Reduction Processor



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1. GENERAL

The NR-100 is a Dolby C-Type noise reduction processor unit designed specifically for use with the Nakamichi cassette decks 1000ZXL, 700ZXL and 700ZXE.
Following photographs show the appearance of the NR-100.

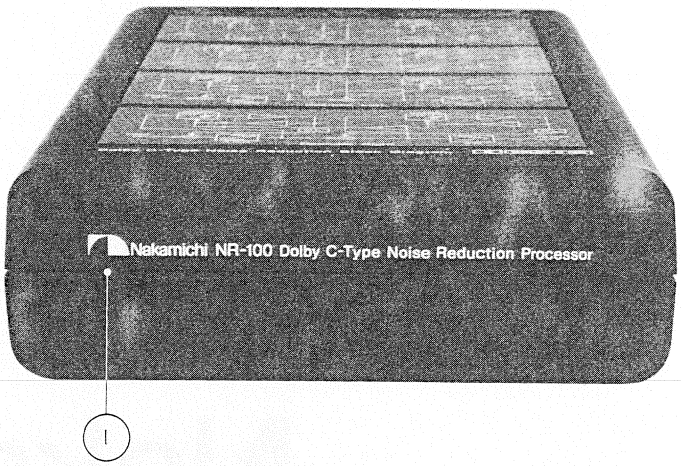

Fig. 1.1 Front View

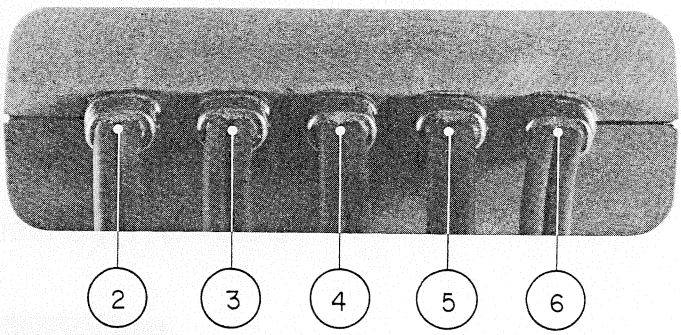

Fig. 1.2 Rear View

1. Power Indicator
2. Encoder Input Pin Cord
3. Encoder Output Pin Cord
4. Decoder Input Pin Cord
5. Decoder Output Pin Cord
6. Power Supply DIN Plug and Remote Control DIN Socket

2. PERFORMANCE DATA

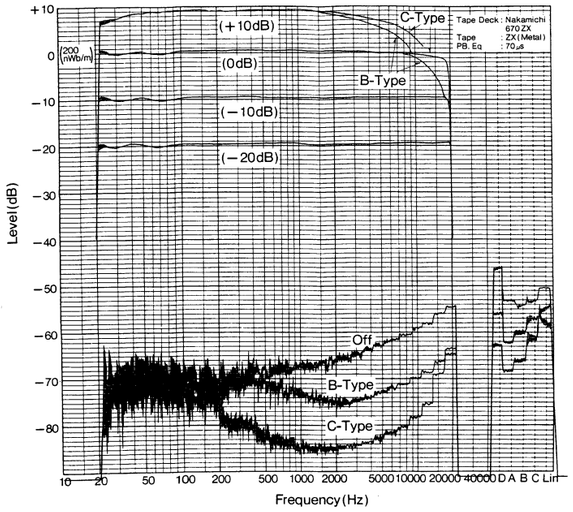

Fig. 2.1 Record/Playback Frequency Response and Noise Spectrum Analysis

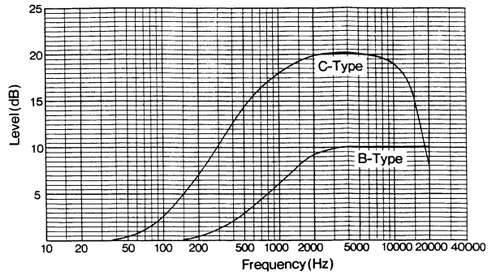

Fig. 2.2 Low-level Encode Frequency Response (Less than −60 dB)

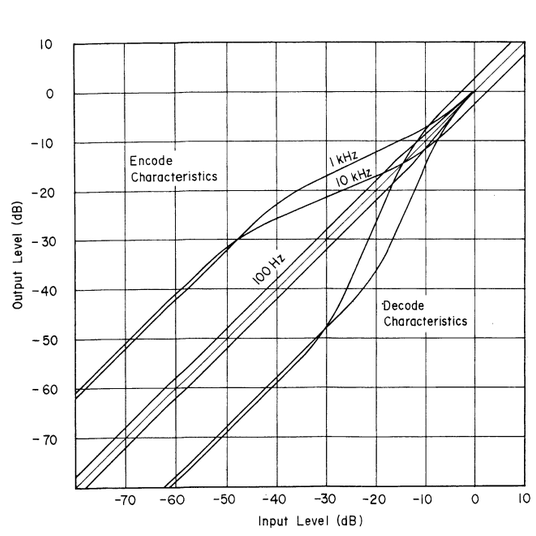

Fig. 2.3 Encode/Decode Characteristics

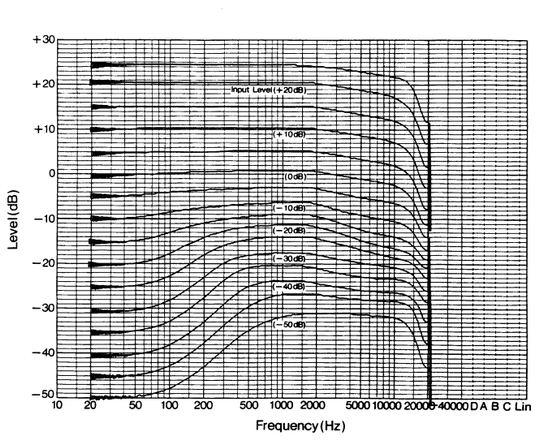

Fig. 2.4 Encode Characteristics (Level vs. Frequency)

3. MECHANISM ASS'Y AND PARTS LIST

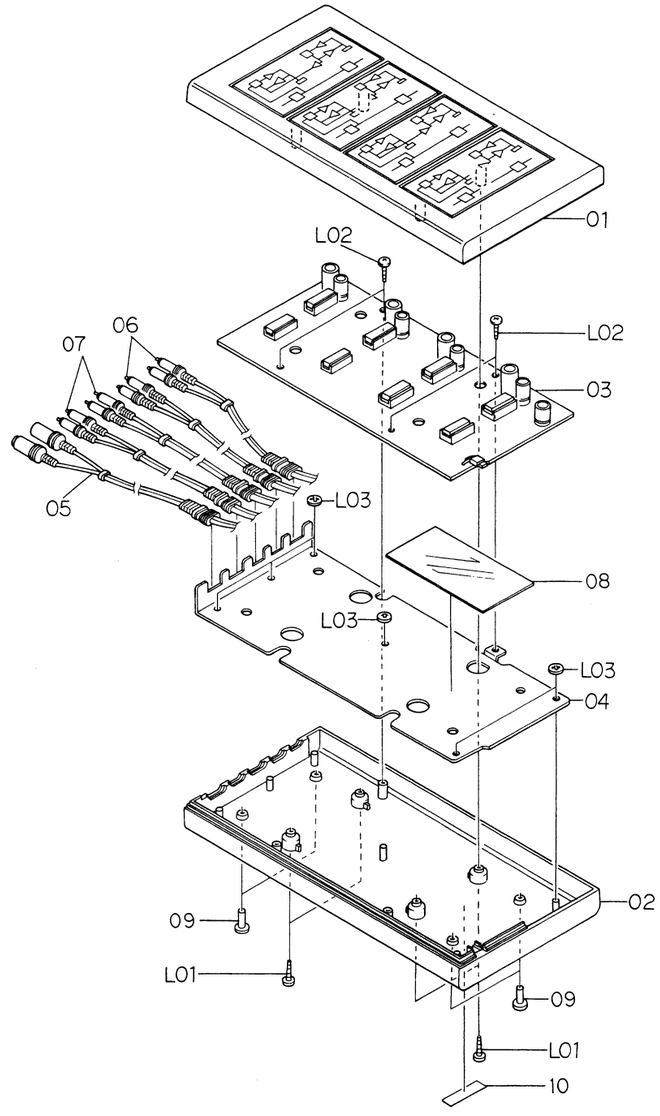

Fig. 3

Schematic Ref. No.	Part No.	Description	Q'ty	Schematic Ref. No.	Part No.	Description	Q'ty
		NR-100 Mechanism Ass'y		08	0J04446A	Insulator	1
				09	0H03920A	Leg	4
01	0H03951A	Upper Cabinet	1	10	0M04280A	Serial Number Plate	1
02	HA04157A	Bottom Cover Ass'y	1	L01	0E00948A	BT Screw M3x10 Philips Binding Head (Black Chromate)	4
03	BA04423A	Main P.C.B. Ass'y	1				
04	0J04368A	Shield Plate	1	L02	0E00868A	BT Screw M3x8 Philips Binding Head	4
05	BA04429A	8P DIN Socket Ass'y	1				
06	BA04428A	Pin Cord A Ass'y	2	L03	0E00874A	C-Ring 2mm	5
07	BA04427A	Pin Cord B Ass'y	2				

4. MOUNTING DIAGRAM AND PARTS LIST

4.1. Main P.C.B. Ass'y

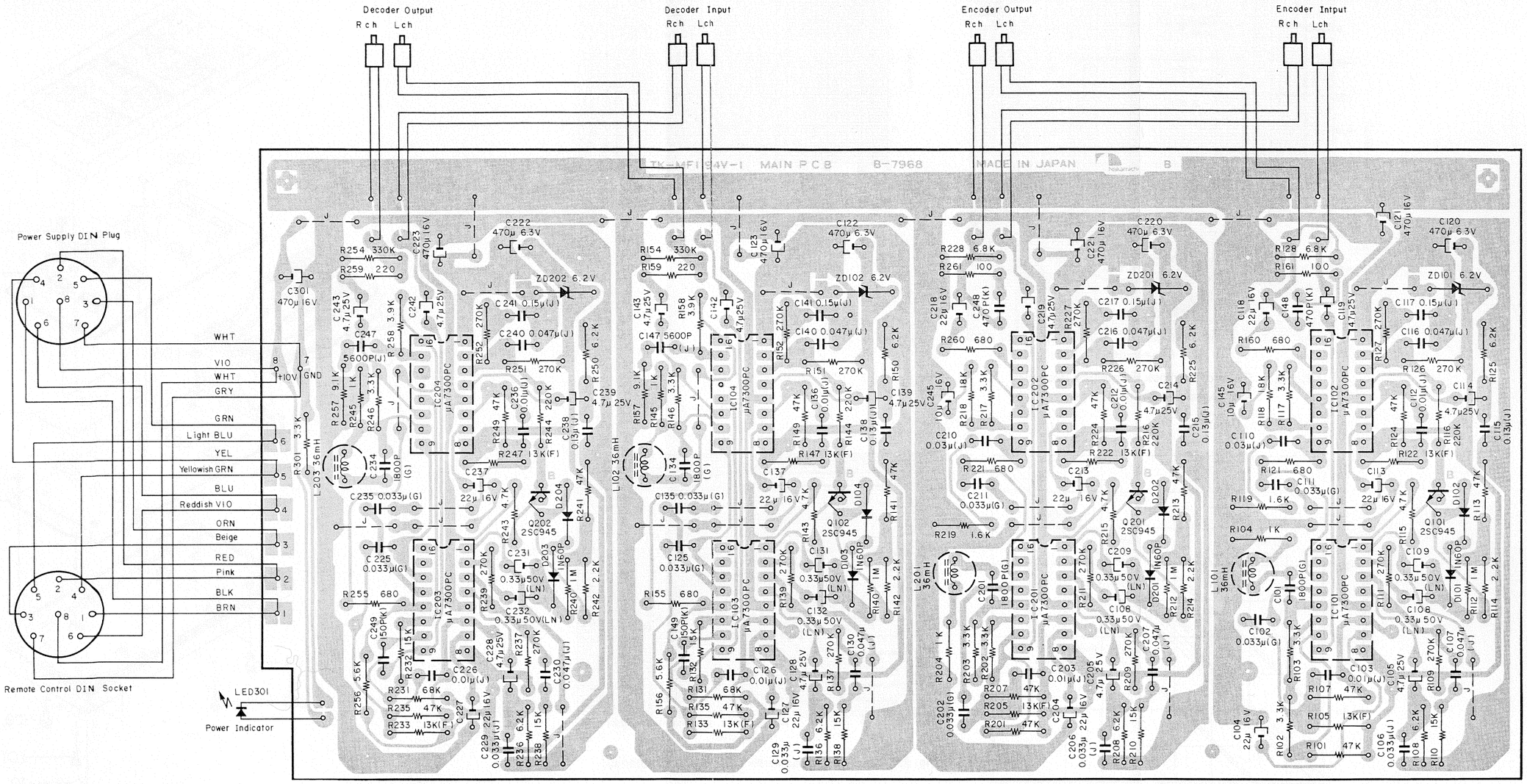

Fig. 4.1.1 Serial No.: Q70102001 –

Notes: 1. Mounting Diagram shows a dip side view of the printed circuit board.
2. Diode is 1SS53, 1S953, or 1S1555 unless otherwise specified.
3. Table of wire colors:

BLK – Black	WHT – White	YEL – Yellow
BLU – Blue	ORN – Orange	VIO – Violet
GRN – Green	GRY – Gray	
RED – Red	BRN – Brown	

Schematic Ref. No.	Part No.	Description
	BA04423A	**Main P.C.B. Ass'y** Serial No.: Q70102001 –
	0B07968B	Main P.C.B.
IC101,102	0B06200A	IC μA7300PC
103,104		
201,202		
203,204		
Q101,102	0B06100A	Transistor 2SC945 (A)
201,202		
LED301	0B08880A	LED RP5532K
ZD101,102	0B06314A	Zener Diode 6.2V RD6.2EB3
201,202		
D101,103	0B00030A	Germanium Diode 1N60P
201,203		
D102,104	0B01909A	Silicon Diode 1S1555
202,204		
L101,102	0B03919A	Inductor 36mH
201,202		
R101,107	0B05641A	Carbon Resistor 47K ERD-25T J
113,124		
135,141		
149,201		
207,213		
224,235		
241,249		
R102,103	0B01681A	Carbon Resistor 3.3K ERD-25T J
117,146		
202,203		
217,246		
301		
R104,145	0B01857A	Carbon Resistor 1K ERD-25T J
204,245		
R105,122	0B09557A	Metal Film Resistor 13K SN14K2E F
133,147		
205,222		
233,247		
R108,125	0B09271A	Carbon Resistor 6.2K ERD-25T J
136,150		
208,225		
236,250		
R109,111	0B05620A	Carbon Resistor 270K ERD-25T J
126,127		
137,139		
151,152		
209,211		
226,227		
237,239		
251,252		
R110,132	0B01683A	Carbon Resistor 15K ERD-25T J
138,210		
232,238		
R112,140	0B05776A	Carbon Resistor 1M ERD-25T J
212,240		
R114,142	0B05622A	Carbon Resistor 2.2K ERD-25T J
214,242		
R115,143	0B01846A	Carbon Resistor 4.7K ERD-25T J
215,243		
R116,144	0B05625A	Carbon Resistor 220K ERD-25T J
216,244		
R118,218	0B05560A	Carbon Resistor 18K ERD-25T J
R119,219	0B09565A	Carbon Resistor 1.6K ERD-25T J

Schematic Ref. No.	Part No.	Description
R121,155	0B05794A	Carbon Resistor 680 ERD-25T J
160,221		
255,260		
R128,228	0B01682A	Carbon Resistor 6.8K ERD-25T J
R131,231	0B05692A	Carbon Resistor 68K ERD-25T J
R154,254	0B05627A	Carbon Resistor 330K ERD-25T J
R156,256	0B01887A	Carbon Resistor 5.6K ERD-25T J
R157,257	0B09226A	Carbon Resistor 9.1K ERD-25T J
R158,258	0B05675A	Carbon Resistor 3.9K ERD-25T J
R159,259	0B01933A	Carbon Resistor 220 ERD-25T J
R161,261	0B01679A	Carbon Resistor 100 ERD-25T J
C101,134	0B09409A	PP Capacitor 1800P 100V G
201,234		
C102,111	0B09240A	PP Capacitor 0.033μ 100V G
125,135		
202,211		
225,235		
C103,112	0B05681A	Mylar Capacitor 0.01μ 50V J
126,136		
203,212		
226,236		
C104,113	0B01862A	Electrolytic Capacitor 22μ 16V
118,127		
137,204		
213,218		
227,237		
C105,114	0B01402A	Electrolytic Capacitor 4.7μ 25V
119,128		
139,142		
143,205		
214,219		
228,239		
242,243		
C106,129	0B05583A	Mylar Capacitor 0.033μ 50V J
206,229		
C107,116	0B05796A	Mylar Capacitor 0.047μ 50V J
130,140		
207,216		
230,240		
C108,109	0B09567A	Electrolytic Capacitor 0.33μ 50V (LN)
131,132		
208,209		
231,232		
C110,210	0B09594A	Mylar Capacitor 0.03μ 50V J
C115,138	0B09566A	Mylar Capacitor 0.13μ 50V J
215,238		
C117,141	0B05914A	Mylar Capacitor 0.15μ 50V J
217,241		
C120,122	0B05842A	Electrolytic Capacitor 470μ 6.3V
220,222		
C121,123	0B01392A	Electrolytic Capacitor 470μ 16V
221,223		
301		
C145,245	0B01412A	Electrolytic Capacitor 10μ 16V
C147,247	0B05659A	Mylar Capacitor 5600P 50V J
C148,248	0B09286A	Ceramic Capacitor 470P 50V K
C149,249	0B09281A	Ceramic Capacitor 150P 50V K

Schematic Ref. No.	Part No.	Description
	BA04423A	**Main P.C.B. Ass'y**
		Serial Nos.: Q70101001 – Q70102000
	0B07968A	Main P.C.B.
IC101,102	0B06200A	IC μA7300PC
103,104		
201,202		
203,204		
Q101,102	0B06100A	Transistor 2SA945 (A)
201,202		
LED301	0B08880A	LED RP5532K
ZD101,102	0B06268A	Zener Diode 5.6V RD5.6EB3
201,202		
D101,103	0B00030A	Germanium Diode 1N60P
201,203		
D102,104	0B01909A	Silicon Diode 1S1555
202,204		
L101,102	0B03919A	Inductor 36mH
201,202		
R101,107	0B05641A	Carbon Resistor 47K ERD-25T J
113,118		
124,135		
141,149		
201,207		
213,218		
224,235		
241,249		
R102,103	0B01681A	Carbon Resistor 3.3K ERD-25T J
117,146		
202,203		
217,246		
301		
R104,145	0B01857A	Carbon Resistor 1K ERD-25T J
155,204		
245,255		
R105,122	0B09557A	Metal Film Resistor 13K SN14K2E F
133,147		
205,222		
233,247		
R108,125	0B09271A	Carbon Resistor 6.2K ERD-25T J
136,150		
208,225		
236,250		
R109,111	0B05620A	Carbon Resistor 270K ERD-25T J
126,127		
137,139		
151,152		
209,211		
226,227		
237,239		
251,252		
R110,138	0B01683A	Carbon Resistor 15K ERD-25T J
210,238		
R112,140	0B05776A	Carbon Resistor 1M ERD-25T J
212,240		
R114,142	0B05622A	Carbon Resistor 2.2K ERD-25T J
214.242		
R115,143	0B01846A	Carbon Resistor 4.7K ERD-25T J
215,243		
R116,144	0B05625A	Carbon Resistor 220K ERD-25T J
216,244		
R119,219	0B09565A	Carbon Resistor 1.6K ERD-25T J
R121,160	0B05794A	Carbon Resistor 680 ERD-25T J
221,260		

Schematic Ref. No.	Part No.	Description
R128,130	0B01682A	Carbon Resistor 6.8K ERD-25T J
228,230		
R129,153	0B05627A	Carbon Resistor 330K ERD-25T J
154,229		
253,254		
R132,232	0B05698A	Carbon Resistor 1.5K ERD-25T J
R156,256	0B01887A	Carbon Resistor 5.6K ERD-25T J
R157,257	0B09226A	Carbon Resistor 9.1K ERD-25T J
R158,258	0B05675A	Carbon Resistor 3.9K ERD-25T J
R159,259	0B01933A	Carbon Resistor 220 ERD-25T J
R161,261	0B01679A	Carbon Resistor 100 ERD-25T J
C101,134	0B09409A	PP Capacitor 1800P 100V G
201,234		
C102,111	0B09240A	PP Capacitor 0.033μ 100V G
125,135		
202,211		
225,235		
C103,112	0B05681A	Mylar Capacitor 0.01μ 50V J
126,136		
203,212		
226,236		
C104,113	0B01862A	Electrolytic Capacitor 22μ 16V
127,137		
204,213		
227,237		
C105,114	0B01402A	Electrolytic Capacitor 4.7μ 25V
118,119		
128,139		
142,143		
205,214		
218,219		
228,239		
242,243		
C106,129	0B05583A	Mylar Capacitor 0.033μ 50V J
206,229		
C107,116	0B05796A	Mylar Capacitor 0.047μ 50V J
130,140		
207,216		
230,240		
C108,109	0B09567A	Electrolytic Capacitor 0.33μ 50V (LN)
131,132		
208,209		
231,232		
C110,210	0B09045A	Mylar Capacitor 0.027μ 50V J
C115,138	0B09566A	Mylar Capacitor 0.13μ 50V J
215,238		
C117,141	0B05914A	Mylar Capacitor 0.15μ 50V J
217,241		
C120,122	0B09257A	Electrolytic Capacitor 2200μ 6.3V
220,222		
C121,123	0B01392A	Electrolytic Capacitor 470μ 16V
221,223		
301		
C145,146	0B01412A	Electrolytic Capacitor 10μ 16V
245,246		
C147,247	0B05659A	Mylar Capacitor 5600P 50V J
C148,248	0B09286A	Ceramic Capacitor 470P 50V K

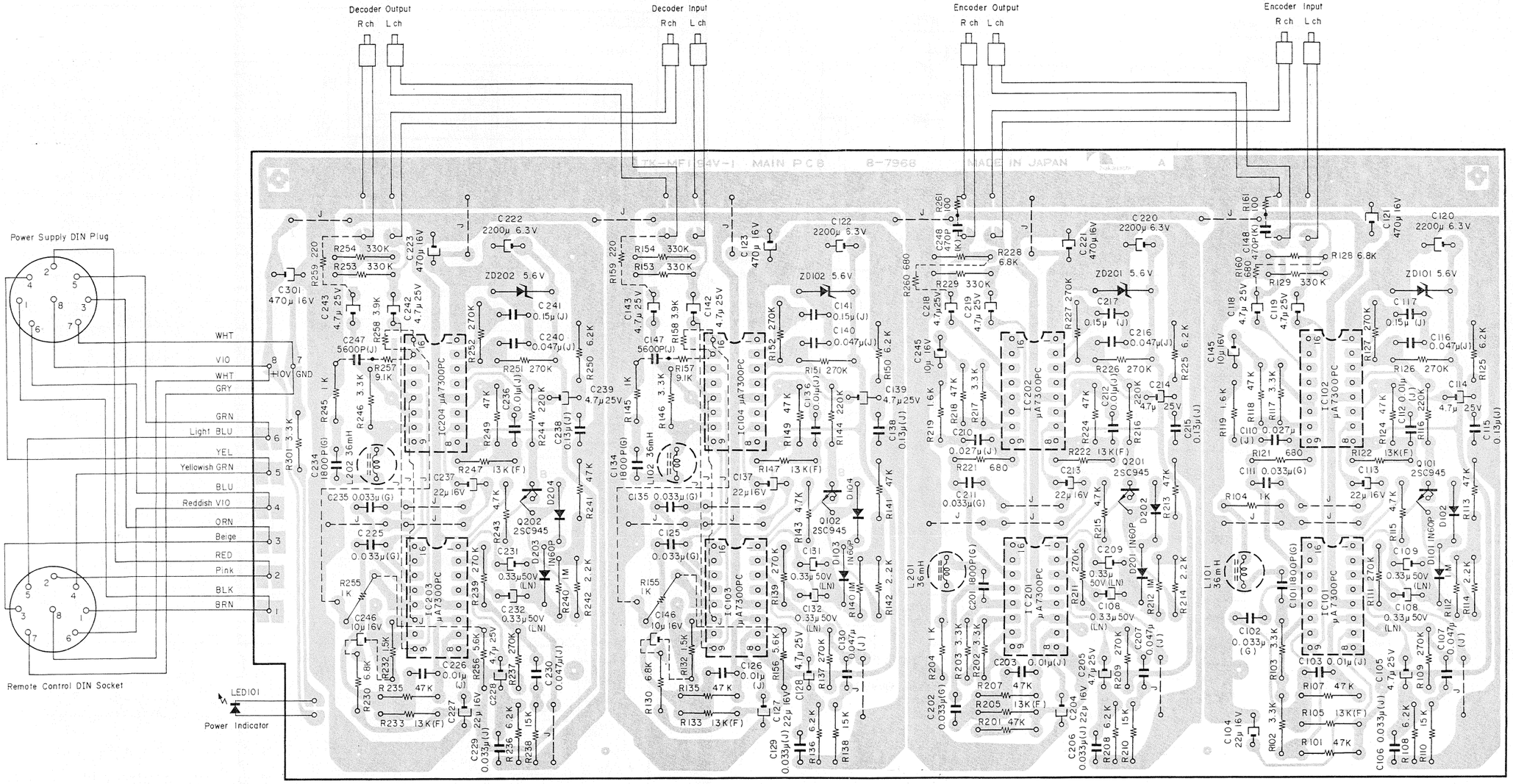

Fig. 4.1.2 Serial Nos.: Q70101001 – Q70102000

Notes: 1. Mounting Diagram shows a dip side view of the printed circuit board.
2. Diode is 1SS53, 1S953, or 1S1555 unless otherwise specified.
3. Table of wire colors:

BLK – Black	WHT – White	YEL – Yellow
BLU – Blue	ORN – Orange	VIO – Violet
GRN – Green	GRY – Gray	
RED – Red	BRN – Brown	

5. BLOCK DIAGRAM

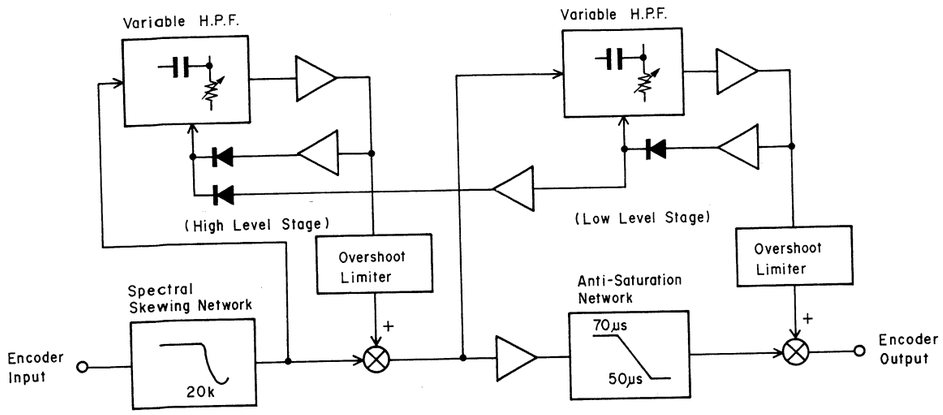

Fig. 5.1 Encoder

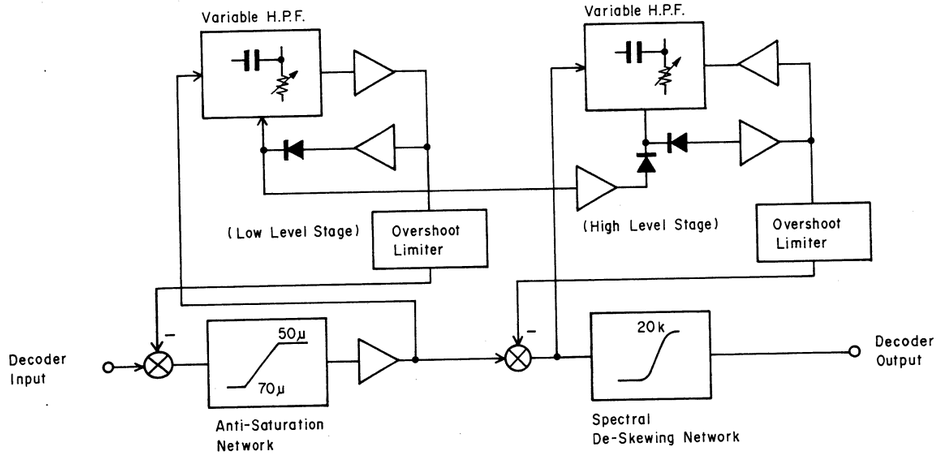

Fig. 5.2 Decoder

6. SCHEMATIC DIAGRAM

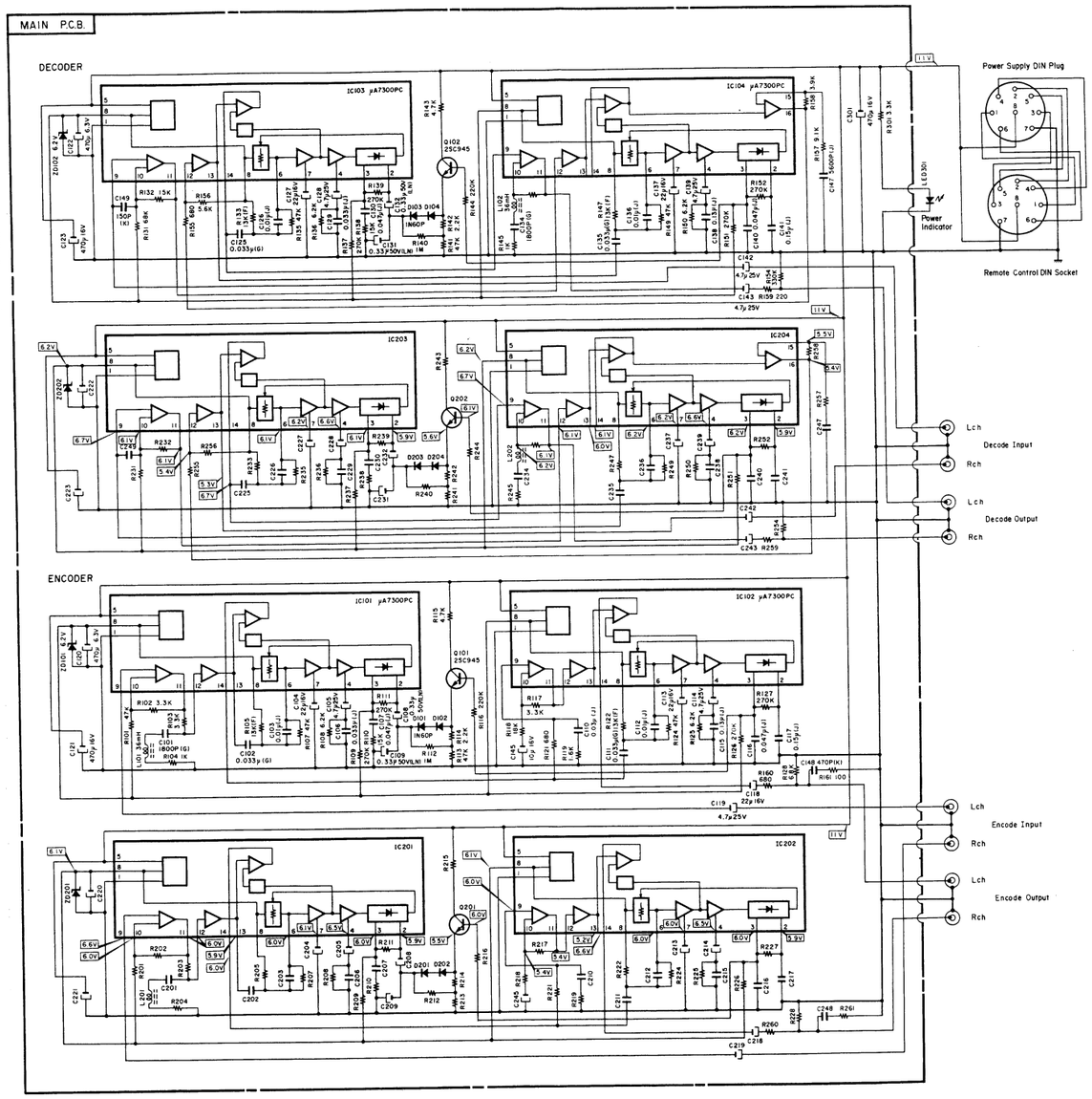

Fig. 6.1 Serial No.: Q70102001 –

Note: Diode is 1SS53, 1S953, or 1S1555 unless otherwise specified.

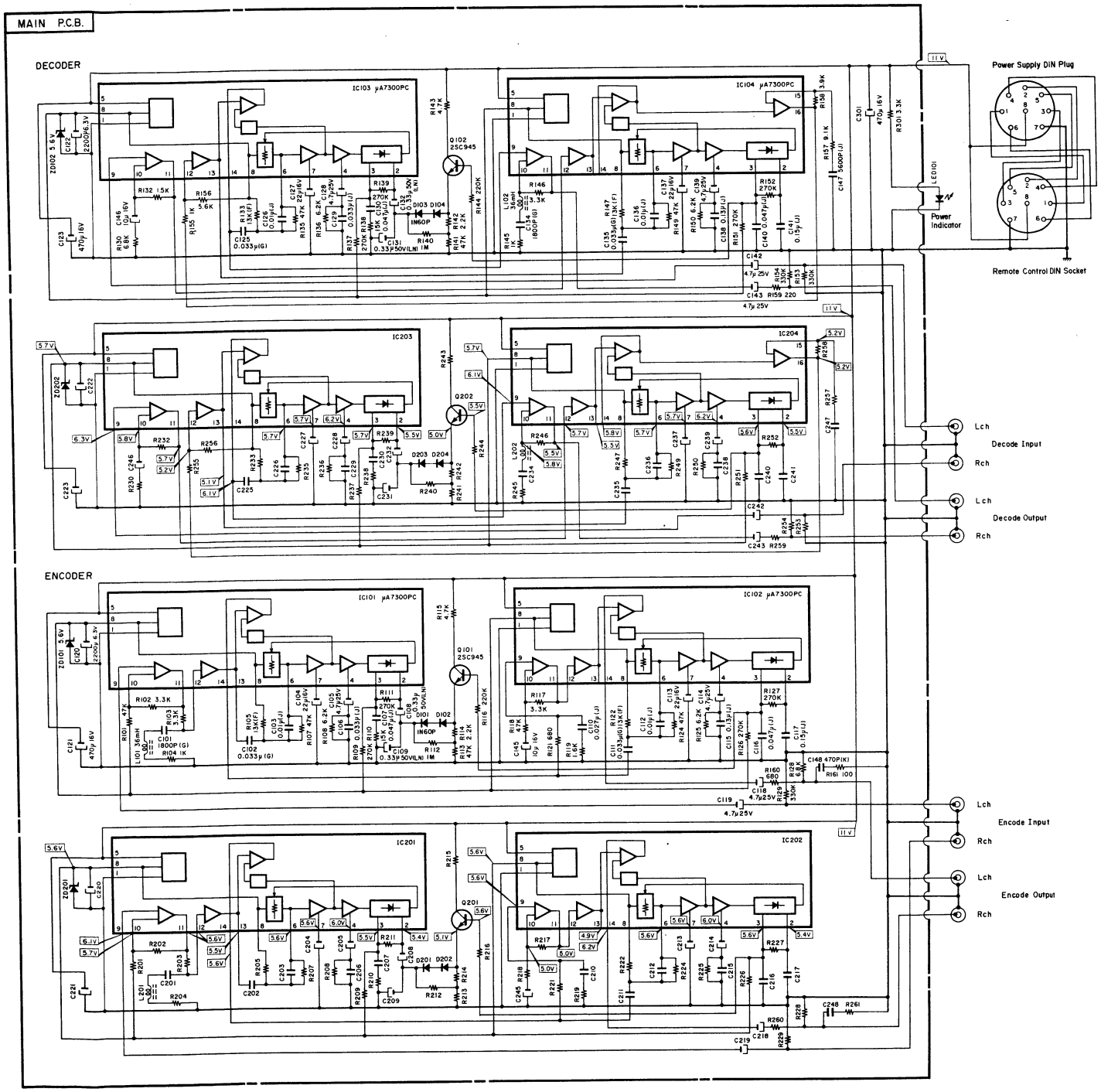

Fig. 6.2 Serial Nos.: Q70101001 – Q70102000

Note: Diode is 1SS53, 1S953, or 1S1555 unless otherwise specified.

7. MEASUREMENTS

7.1. Measurement Connection

(1) Connection

(a) Connect a Generator output to the Encoder Input Jacks of the NR-100 through resistors (12 kΩ (F) and 2.6 kΩ (F)) as shown in Fig.7.1.

(b) Connect a VTVM and Distortion Meter to the Decoder Output Jacks of the NR-100.

(c) Connect the Encoder Output Jacks to the Decoder Input Jacks through resistors (1.6 kΩ (F) and 120 kΩ (F)) as shown in Fig. 7.1.

Note: Connection shall be made for both channels.

(2) Reference Input Level Setting

(a) Remove the Generator from the NR-100, then connect a 61 kΩ (J) resistor as shown in Fig. 7.2.

(b) Feed in 400 Hz, then adjust the Generator output to obtain 96.5 mV on the VTVM.

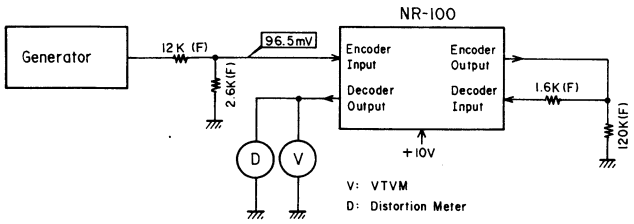

Fig. 7.1 Connecting Diagram

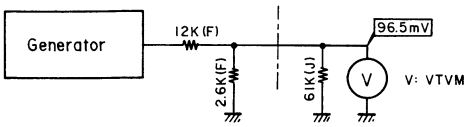

Fig. 7.2

7.2. Measurements

(1) Frequency Response

(a) Set the reference input level of a Generator in accordance with item 7.1-(2), then connect it to the NR-100 as per item 7.1-(1).

(b) Decrease the Generator output level by 20 dB.

(c) Feed in 20 Hz – 20 kHz (–20 dB), then read the levels on the VTVM.

(2) Total Harmonic Distortion

(a) Set the reference input level of a Generator in accordance with item 7.1-(2), then connect it to the NR-100 as per item 7.1-(1).

(b) Feed in 400 Hz (0 dB), then read the Distortion Meter.

(3) Signal to Noise Ratio

(a) Set the reference input level of a Generator in accordance with item 7.1-(2), then connect it to the NR-100 as per item 7.1-(1).

(b) Feed in 400 Hz (0 dB), then read the signal levels on the VTVM.

(c) Remove the Generator from the Encoder Input Jacks of the NR-100, then connect the signal side and ground side of both Encoder Input Jacks with shorting plugs.

(d) Read the noise levels on the VTVM.

(e) Check the level difference between (b) and (d).

Note: The filter of IHF-A curve shall be used in the measurements.

7.3. Dolby NR C-Type Circuit Check

Dolby NR C-type circuit is composed of Dolby NR IC (μA7300PC) and its peripheral circuit, and it has no adjustment point.

Perform the following checks, and make sure that the IC operates accurately, i.e., accuracy of the frequency response through IC.

(1) Encoder

Signal Source: 1.4 kHz to Encoder Input Jacks

Output Connection: VTVM to pin No. 13 of IC101 (IC201) and pin No. 14 of IC102 (IC202)

(a) Feed in 1.4 kHz to Encoder Input Jacks, then adjust the Generator Output Control to obtain 10 mV/3.16 mV on the VTVM at pin No. 13 of the high-level stage IC101 (IC201).

(b) Then, check to insure that the reading is typically 21.1 mV (+6.5 dB)/11.7 mV (+11.4 dB) on the VTVM at pin No. 14 of the low-level stage IC102 (IC202).

(2) Decoder

Signal Source: 1.4 kHz to Decoder Input Jacks

Output Connection: VTVM to pin No. 14 of IC103 (IC203) and pin No. 13 of IC104 (IC204)

(a) Feed in 1.4 kHz to Decoder Input Jacks, then adjust the Generator Output Control to obtain 10 mV/3.16 mV on the VTVM at pin No. 14 of the high-level stage IC103 (IC203).

(b) Then, check to insure that the reading is typically 21.1 mV (+6.5 dB)/11.7 mV (+11.4 dB) on the VTVM at pin No. 13 of the low-level stage IC104 (IC204).

8. SPECIFICATIONS

Power Supply	10 V DC, from remote control jack
Dimensions	120 (W) x 41 (H) x 240 (D) millimeters
Approximate Weight	880 g 1 lb. 15 oz.
Cable Length	70 cm 27-1/2 inches

- Specifications and appearance design are subject to change for further improvement without notice.
- Dolby NR under license from Dolby Laboratories Licensing Corporation.
- The word "Dolby" and the Double-D-Symbol are trademarks of Dolby Laboratories Licensing Corporation.